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METHOD FOR DETERMINATION OF AIR PERMEABILITY OF FABRICS

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METHOD FOR DETERMINATION OF AIR PERMEABILITY OF FABRICS

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Indian Standard

METHOD FOR DETERMINATION OF AIR PERMEABILITY OF FABRICS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 31 August 1984, after the draft finalized by the Physical Methods of Test Sectional Committee had been approved by the Textile Division Council.

0.2 Air permeability is an important feature for fabrics used for special technical purposes such as parachutes, filter cloths, felts, impregnated fabrics, membranes, packing materials, etc. Air permeability may also be used for clothing fabric to indicate their breathability.

0.3 This standard is based on extensive tests carried out by various textile laboratories on different types of instruments available with them covering a wide range of fabrics from light to heavy constructions like cambric, lawn, poplin, dress material, cotton and blended suitings, etc, and the results obtained on different instruments were found to be in close agreement with each other.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*.

1. SCOPE

1.1 This standard prescribes a method for measuring the permeability of fabrics to air and is applicable to industrial fabrics that are permeable to air. However, this standard is not suitable for parachute fabrics.

2. PRINCIPLE

2.1 This method is based on the measurement of the rate of flow of air through a given area of fabric by a given pressure drop across the fabric.

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*Rules for rounding off numerical values (*revised*).

3. TERMINOLOGY

3.1 For the purpose of this standard, air permeability shall mean the volume (cm^3) of air passing through 1 cm^2 of fabric per second at a pressure difference of 1 cm head of water.

4. SAMPLING

4.1 Samples drawn in accordance with the procedure laid down in material specification for the fabric or as agreed to between the parties concerned shall be held to be representative of the lot.

5. ATMOSPHERIC CONDITIONS FOR CONDITIONING AND TESTING

5.1 Prior to test, the samples shall be conditioned to moisture equilibrium in the standard atmosphere of 65 ± 2 percent relative humidity and 27 ± 2°C temperature from dry side as laid down in IS : 6359-1971*. The test shall be carried out in the standard atmosphere.

6. APPARATUS

6.1 The apparatus shall consist of the following arrangements:

a) Means for drawing or forcing air through the fabric of known area.

b) Circular orifice of definite known area.

c) Provision to hold the fabric so that there is no peripheral leakage of air.

d) Means for adjusting the pressure drop across the fabric to a known amount.

e) Means for measuring the rate of flow of air through the fabric.

f) Means for checking the calibration of air flowmeter (*see* Appendix A).

6.1.1 It is desirable that the apparatus shall be capable of testing large pieces of fabrics without cutting.

7. PROCEDURE

7.1 Take the conditioned specimen and mount a portion between the clamp and circular orifice with sufficient tension to eliminate wrinkles, if any, taking care to see that the fabric is not destorted in its own plane.

7.2 Start the suction fan or other means to force the air through the fabric and adjust the rate of flow of air till pressure drop of one centimetre water head across the fabric is indicated.

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*Method for conditioning of textiles.

7.3 Note the rate of flow of air in cm^3/s.

7.4 Repeat the test at other different places. In all, at least 10 tests shall be carried out.

8. CALCULATION

8.1 Calculate the rate of flow of air per cm^2 of fabric in cm^3/s by the following formula:

$$R = \frac{r}{A}$$

where

R = rate of flow of air/cm^2 of fabric in cm^3/s,

r = mean rate of flow of air in cm^3/s, and

A = area cm^2 of fabric under test in cm^2.

9. REPORT

9.1 The report shall include the following information:

a) Type of fabric tested,
b) Name of the instrument used,
c) Number of tests recommended,
d) Average air permeability value ($cm^3/cm^2/s$), and
e) C. V. percent.

APPENDIX A

[*Clause* 6.1(f)]

CALIBRATION OF AIR FLOW INSTRUMENTS

A-1. GENERAL

A-1.1 Air flow instruments are very sensitive instruments and therefore require delicate and careful handling to avoid malfunctioning. Malfunctioning of the instruments can be caused by air leakage, physical damage to the nozzle or test plate, wornout condition of the gasket or over flow of liquid in the monometer, etc.

A-2. CALIBRATION

A-2.1 Different instruments are provided with different means and accessories for the calibration and checking of the air flow instruments, like steel plates with holes to give pre-determined air flow values, capillary resistances having pre-determined air flow values to be used in conjunction with roto meters, set of nozzles and plates, etc. Before using the instruments, check and calibrate with the help of the calibration accessories provided with the instruments as per the instructions given in the Instrument Manual.